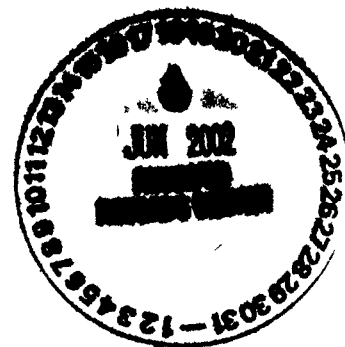


**ENVIRONMENTAL RESTORATION  
RFCA STANDARD OPERATING PROTOCOL  
FOR ROUTINE SOIL REMEDIATION  
FY02 NOTIFICATION #02-05  
IHSS GROUP S 800-2 AND 800-5**



**June 2002**

**DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE**

**ADMIN RECORD**

**IA-A-000992**

**ENVIRONMENTAL RESTORATION  
RFCA STANDARD OPERATING PROTOCOL  
FOR ROUTINE SOIL REMEDIATION  
FY02 NOTIFICATION#02-05  
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Approval received from the Colorado Department of Public Health and Environment

June 10, 2002

Approval letter contained in the Administrative Record.

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## ACRONYMS

|         |   |
|---------|---|
| AL      | action level  |
| BMP     | best management practice                                    |
| cy      | cubic yard  |
| D&D     | Decontamination and Decommissioning                         |
| EDDIE   | Environmental Data Dynamic Information Exchange             |
| ER      | Environmental Restoration                                   |
| ER RSOP | Environmental Restoration RSOP for Routine Soil Remediation |
| FY      | Fiscal Year   |
| IA      | Industrial Area   |
| IASAP   | Industrial Area Sampling and Analysis Plan                  |
| IHSS    | Individual Hazardous Substance Site                         |
| NPWL    | New Process Waste Lines                                     |
| OPWL    | Original Process Waste Lines                                |
| PAC     | Potential Area of Concern                                   |
| PCB     | polychlorinated biphenyl                                    |
| pCi/g   | picocuries per gram   |
| pCi/L   | picocuries per liter  |
| PCOC    | potential contaminant of concern                            |
| POC     | Point of Compliance   |
| POE     | Point of Evaluation   |
| RCRA    | Resource Conservation and Recovery Act                      |
| RFCA    | Rocky Flats Cleanup Agreement                               |
| RFETS   | Rocky Flats Environmental Technology Site                   |
| RISS    | Remediation, Industrial D&D, and Site Services              |
| RSOP    | RFCA Standard Operating Protocol                            |
| SID     | South Interceptor Ditch                                     |
| SVOC    | semivolatile organic compound                               |
| UBC     | Under Building Contamination                                |
| µg/L    | micrograms per liter  |
| VOC     | volatile organic compound                                   |

## 1.0 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002) Fiscal Year (FY)02 Notification includes the notification to remediate Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PACs), and Under Building Contamination (UBC) Sites at the Rocky Flats Environmental Technology Site (RFETS) Industrial Area (IA) during FY02. The purpose of this Notification is to invoke the ER RSOP for IHSS Groups 800-2 and 800-5. Activities specified in the ER RSOP are not reiterated here, however, deviations from the ER RSOP are noted where appropriate.

Soil with contaminant concentrations greater than RFCA Tier I Action Levels (ALs) and associated debris will be removed in accordance with RFCA and the ER RSOP. Soil with contaminant concentrations less than RFCA Tier I ALs will be evaluated for additional removal through the consultative process using stewardship and ALARA considerations (Section 5.4 and 5.5 of the ER RSOP).

Proposed remediation sites covered under ER RSOP Notification #02-05 are listed in Table 1 and the locations are shown on Figure 1.

**Table 1**  
**FY02 Potential Remediation Areas for IHSS Groups 800-2 and 800-5**

| IHSS Group | IHSS Name and Location  | Potential Contaminants   | Media                       | Estimated Volume |
|------------|---|--|-----------------------------|------------------|
| 800-2      | UBC 881 – Laboratory and Office   | Radionuclides<br>Metals<br>Polychlorinated Biphenyls (PCBs)<br>Semivolatile Organic Compounds (SVOCs)<br>Volatile Organic Compounds (VOCs) | Surface and Subsurface Soil | <1 cy            |
|            | 800-1205 – Building 881, East Dock  | Radionuclides<br>Metals  | Surface Soil                | <1 cy            |
|            | 000-121 – Original Process Waste Line (OPWL) Tank 24 - Seven 2,700-Gallon Steel Process Waste Tanks | Radionuclides<br>Metals<br>SVOCs<br>VOCs   | Subsurface Soil             | <1 cy            |
|            | 000-121 – OPWL Tank 32 - 131,160-Gallon Underground Concrete Secondary Containment Sump             | Radionuclides<br>Metal<br>SVOCs<br>VOCs  | Subsurface Soil             | <1 cy            |
|            | 000-121 – OPWL Tank 39 - Four 250-Gallon Steel Process Waste Tanks                                  | Radionuclides<br>Metal<br>SVOCs<br>VOCs  | Subsurface Soil             | <1 cy            |
| 800-5      | UBC 887 – Process and Sanitary Waste Tanks  | Radionuclides<br>Metal<br>SVOCs<br>VOCs  | Surface and Subsurface Soil | <1 cy            |
|            | IHSS 800-177 – Building 885 Drum Storage  | Radionuclides<br>Metals<br>SVOCs<br>VOCs   | Surface and Subsurface Soil | <1 cy            |

## **2.0 IHSS GROUPS 800-2 AND 800-5**

IHSS Group 800-2 includes UBC 881 – Laboratory and Office, PAC 800-1205 – Building 881, East Dock, IHSS 100-121 – Original Process Waste Line (OPWL) Tank 24 - Seven 2,700-Gallon Steel Process Waste Tanks, Tank 32 - 131,160 Gallon Underground Concrete Secondary Containment Sump, and Tank 39, Four 250-Gallon Steel Process Waste Tanks IHSS Group 800-5 includes UBC 887 – Process and Sanitary Waste Tanks and IHSS 800-177 – Building 885 Drum Storage Groups 800-2 and 800-5 are shown on Figure 2

### **2.1 Potential Contaminants of Concern**

Potential contaminants of concern (PCOCs) at IHSS Groups 800-2 and 800-5 were determined based on process knowledge and data collected during previous studies (DOE 1992 - 2001, DOE 2001a, and DOE 2000a)

### **2.2 Project Conditions**

The following conditions are present at this site

- UBC 881,
- Building 881, which is primarily below ground (disposition of Building 881 has not yet been determined),
- Tank 39 which was previously removed from UBC 881,
- Tanks 24 and 32 at Building 887
- UBC 887,
- IHSS 177, which encompasses Building 887 (Building 887 and slab will be removed by Remediation, Industrial Decontamination and Decommissioning [D&D] and Site Services [RISS] Facility D&D staff),
- Foundation drains on all sides of Buildings 881 and 887,
- Additional sumps and pits at UBC 881,
- Potentially contaminated sewer system between Buildings 881 and 887,
- One sump on the eastern side of Building 881, and
- OPWL and the New Process Waste Line (NPWL) between Buildings 881 and Tanks 24 and 32 at Building 887

### **2.3 Remediation Plan**

The ER RSOP remediation plan for IHSS Group 800-2 and 800-5 includes the following objectives

- Remove structures and pipelines if within 3 feet of existing grade, if not removed by RISS Facility D&D staff
- Remove soil with contaminant concentrations greater than Tier I ALs (Figure 2)
- Remove soil with contaminant concentrations less than Tier I ALs if indicated through the ER RSOP stewardship or ALARA evaluations (the consultative process)
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs and associated sump and pits at UBC 881
- Disrupt the foundation drain potential pathway, if not disrupted by RISS Facility D&D staff.
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs and associated process waste lines between Building 881 and Tanks 24 and 32 at Building 887
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs and associated sanitary sewer lines and structures if not removed by RISS Facility D&D staff
- RISS Facility D&D staff will remove Tanks 24 and 32 at Building 887 at a later date. Remediation of potentially contaminated soil is covered under this Notification and will be coordinated with the RISS Facility D&D staff
- Collect confirmation samples in accordance with the Industrial Area Sampling and Analysis Plan (IASAP) (DOE 2001a)

Additional remediation for OPWL (Figure 2), if required, will be conducted when IHSS Group 000-2 (OPWL) is addressed. Additional remediation for NPWL, if required, will be conducted when IHSS Group 000-4 (NPWL) is addressed.

It is anticipated that after remediation there will be areas with concentrations of metals, radionuclides, and organics greater than background plus two standard deviations, or method detection limits, but below RFCA Tier II ALs at this site. Additionally, it is anticipated that there will be very few areas with concentrations above RFCA Tier II ALs.

## 2.4 Stewardship Evaluation

Based on the PCOCs (Table 1 and Section 2.1) and the ER RSOP (DOE 2002), it is anticipated that all contamination above RFCA Tier I ALs will be remediated. Figure 2 shows the potential remediation area. Additional remediation to below Tier I ALs is not required by RFCA, but will be evaluated using the consultative process.

Because the full extent of excavation and remediation is not known at this time, an additional stewardship evaluation will be conducted during remediation using the consultative process. A new map of residual contamination will be generated after remediation. The following sections contain the stewardship evaluation.

### 2.4.1 Proximity to Other Contaminant Sources

IHSS Groups 800-2 and 800-5 are located in the RFETS IA. The nearby potential contaminant source is IHSS Group 000-2 (IHSS 162 – Radioactive Site 700 Area). This site, PCOCs, media of interest, proximity and relationship to IHSS Group 800-2 are listed in Table 2 and shown on Figure 2.

**Table 2**  
**Other Potential Contaminant Sources for IHSS Groups 800-2 and 800-5**

| IHSS Group                                    | PCOCs/COCs                               | Media                             | Relationship to IHSS Groups 800-2 and 800-5 |
|---|--|-----------------------------------|---|
| 000-2 – Radioactive Site 700 Area<br>IHSS 162 | Radionuclides<br>Metals<br>SVOCs<br>VOCs | Surface and<br>Subsurface<br>Soil | Approximately 115 feet to the west          |

IHSS Group 000-2 has PCOCs similar to, and in the same media as, IHSS Groups 800-2 and 800-5. It is anticipated that after remediation of this IHSS Group, there will be residual contamination in subsurface soil similar to the residual contamination anticipated at IHSS Groups 800-2 and 800-5.

### 2.4.2 Surface Water Protection

Surface water protection includes the following considerations:

***Is there a pathway to surface water from potential erosion to streams or drainages?***

Building 881 is underground except for the eastern side of the building and the site slopes southward. The site is on a slope above the South Interceptor Ditch (SID) and is subject to erosion and could result in a pathway to surface.

***Do characterization data indicate there are contaminants in surface soil?***

Table 3 lists radionuclide data from IHSS Groups 800-2 and 800-5, along with background values and RFCA ALs for comparison.



**Table 3**  
**Surface Soil Characterization Summary**

| Analysis          | Surface Soil<br>Results<br>(ppm) | Background<br>Results<br>(ppm) | Tier II AL<br>(ppm) | Tier III AL<br>(ppm) |
|-------------------|----------------------------------|--------------------------------|---------------------|----------------------|
| Americium-241     | 0.18                             | 0.0227                         | 38                  | 215                  |
| Plutonium-239/240 | 0.76                             | 0.066                          | 252                 | 1,429                |
| Uranium-234       | 1.31                             | 2.253                          | 307                 | 1,738                |
| Uranium-235       | 0.12                             | 0.0939                         | 24                  | 135                  |
| Uranium-238       | 3.72                             | 2                              | 103                 | 586                  |

***Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?***

There are no POEs or POCs in the vicinity of IHSS Groups 800-2 and 800-5. The closest POE or POC is SW207, which receives water from the 400, 600, and 800 Areas (DOE 2001b).

***Is the IHSS Group in an area with high erosion potential, based on the 100-Year Average Erosion Map?***

Not applicable. The 100-Year Average Erosion Map does not include areas in the IA.

#### **2.4.3 Monitoring**

Monitoring includes the following considerations:

***Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?***

Groundwater monitoring results from well 313589, upgradient of IHSS Groups 800-2 and 800-5, and wells 00797, 5387, 38591, 10592, 10692, and 10792, downgradient of IHSS Groups 800-2 and 800-5, were evaluated (DOE 2000b, 2000c, 2000d, 2001c, 2001d, 2001e). Results from well 313589 indicated uranium-233/234, uranium-238, and nickel concentrations in groundwater were greater than RFCA Tier II ALs. Data from downgradient wells indicated uranium-233/234, and uranium-238 were present at concentrations greater than RFCA Tier II ALs. Data from well 38591 indicated strontium-89/90 was present at concentrations greater than RFCA Tier II ALs. Data from wells 10592 and 10792 indicated selenium concentrations in groundwater were greater than RFCA Tier II ALs. Table 4 lists the maximum results from IHSS Group 800-2 and 800-5 wells that exceeded RFCA Tier II ALs.

**Table 4**  
**Groundwater Exceedances Associated With IHSS Groups 800-2 and 800-5**

| Constituent     | Well<br>311339<br>(pCi/L) | Well<br>00197<br>(pCi/L) | Well<br>538<br>(pCi/L) | Well<br>38591<br>(pCi/L) | Well<br>10532<br>(pCi/L) | Well<br>10592<br>(pCi/L) | Well<br>10192<br>(pCi/L) | Tier II AL<br>(pCi/L) | Tier I AL<br>(pCi/L) |
|-----------------|---------------------------|--------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------|----------------------|
| Strontium-89/90 | -                         | -                        | -                      | 0.901                    | -                        | -                        | -                        | 0.852                 | 85.2                 |
| Uranium-233/234 | 2.35                      | 10.3                     | 11                     | 21.0327                  | 29                       | 19.2                     | 6.51                     | 1.06                  | 106                  |
| Uranium-238     | 1.67                      | 8.1                      | 7.3                    | 13.1608                  | 19                       | 10.6                     | 5.2345                   | 0.768                 | 76.8                 |
| Constituent     | Well<br>311339<br>(pCi/L) | Well<br>00197<br>(pCi/L) | Well<br>538<br>(pCi/L) | Well<br>38591<br>(pCi/L) | Well<br>10532<br>(pCi/L) | Well<br>10592<br>(pCi/L) | Well<br>10192<br>(pCi/L) | Tier II AL<br>(pCi/L) | Tier I AL<br>(pCi/L) |
| Nickel          | 150                       | -                        | -                      | -                        | -                        | -                        | -                        | 140                   | 14,000               |
| Selenium        | -                         | -                        | -                      | -                        | 194                      | -                        | 62.6                     | 50                    | 5,000                |

Groundwater quality at the upgradient well cannot be attributed to IHSS Groups 800-2 and 800-5. Groundwater quality at downgradient wells may have been impacted by potential contamination from IHSS Groups 800-2 and 800-5.

***Can the impact be traced to a specific IHSS Group?***

Radionuclides in groundwater monitoring wells at IHSS Groups 800-2 and 800-5 are similar to constituents detected above background plus two standard deviations in subsurface soil near these sites. However, no Tier II or Tier I exceedances were detected in subsurface soil.

***Are additional monitoring stations needed?***

Current groundwater wells are placed to detect potential contamination at IHSS Groups 800-2 and 800-5.

***Can existing monitoring locations be deleted if additional remediation is conducted?***

Not applicable.

**2.4.4 Stewardship Actions and Recommendations**

The current stewardship actions and recommendations for IHSS Groups 800-2 and 800-5 are as follows:

- Use best management practices (BMPs) to control runoff to nearby surface water during remediation.

- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following
  - Signs and barriers,
  - Restrictions on soil excavation, and
  - Soil excavations controlled through the Site Soil Disturbance Permit process
- Implement long-term stewardship actions, including the following
  - Federal ownership, and
  - Land use restrictions to prevent soil excavation Specific land use restrictions will be discussed in the Site Long-Term Stewardship Plan

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions

## **2.5 Accelerated Action Remediation Goals**

ER RSOP remedial action objectives include the following

- 1 Provide a remedy consistent with the RFETS goal of protection of human health and the environment,
- 2 Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls, and
- 3 Minimize the spread of contaminants during implementation of accelerated actions

The accelerated action remediation goals for IHSS Groups 800-2 and 800-5 include the following

- Remove structures and pipelines if within 3 feet of existing grade, if not removed by RISS Facility D&D staff,
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs
- Remove soil with contaminant concentrations less than RFCA Tier I ALs if indicated through the stewardship and ALARA evaluations (the consultative process),
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs and associated sump and pits at UBC 881,
- Disrupt the foundation drain potential pathway (if not disrupted by RISS Facility D&D staff),
- Remove soil with contaminant concentrations greater than RFCA Tier I ALs and associated process waste lines between Building 881 and Tanks 24 and 32 at Building 887, and

- RISS Facility D&D staff will remove Tanks 24 and 32 at Building 887 at a later date. Remediation of potentially contaminated soil is covered under this Notification and will be coordinated with the RISS Facility D&D staff.

## **2.6 Treatment**

Not applicable

## **2.7 Project-Specific Monitoring**

High-volume air samplers may be used at the remediation area consistent with work controls to determine airborne radioactivity concentrations. Approximate locations of air samplers are shown on Figure 2.

## **2.8 RCRA Units and Intended Waste Disposition**

Portions of NPWL (Figure 2) are within IHSS Groups 800-2 and 800-5. It is anticipated that waste from this unit will be classified as low level mixed waste.

## **2.9 Administrative Record Documents**

DOE, 1992-2001, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, September

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September

DOE, 2000, 2000 First Quarter RFCA Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, August

DOE, 2000, Second Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, November

DOE, 2000, 1999 Annual Rocky Flats Cleanup Agreement Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June

DOE, 2001, Source Evaluation Report for Point of Evaluation SW027 Water Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, March

DOE, 2001, Third Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, February

DOE, 2001, Fourth Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, May

DOE, 2001, First Quarter RFCA Groundwater Monitoring Report for Calendar Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado, August

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January

## **2.10 Projected Schedule**

Remediation of IHSS Groups 800-2 and 800-5 will begin in the 4<sup>th</sup> quarter of 2002

## **3.0 PUBLIC PARTICIPATION**

ER RSOP Notification #02-05 activities were discussed at the March and April 2002 ER/D&D Status meetings. This Notification is available at the Rocky Flats Reading Rooms and on the Environmental Data Dynamic Information Exchange (EDDIE) website at [www.rfets.gov](http://www.rfets.gov)

## **4.0 REFERENCES**

DOE, 1992-2001, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado

DOE, 2000a, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September

DOE, 2000b, 2000 First Quarter RFCA Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, August

DOE, 2000c, Second Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, November

DOE, 2000d, 1999 Annual Rocky Flats Cleanup Agreement Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November

DOE, 2001a, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June

DOE, 2001b, Source Evaluation Report for Point of Evaluation SW027 Water Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, March

DOE, 2001c, Third Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, February

DOE, 2001d, Fourth Quarter RFCA Groundwater Monitoring Report for Calendar Year 2000, Rocky Flats Environmental Technology Site, Golden, Colorado, May

DOE, 2001e, First Quarter RFCA Groundwater Monitoring Report for Calendar Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado, August

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January

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Figure 1  
IA Groups Location Map

EXPLANATION

800-2

800-5

Standard Map Features

Buildings and other structures

Dismantled buildings

Solar Evaporation Ponds (SEPs)

Lakes and ponds

Stream ditches or the drainage features

Fences and the barriers

Permit roads

D roads

Industrial Area site Unit Boundary

DATA SOURCE: AECOM/PAETEC, Inc. (2001) and AECOM/PAETEC, Inc. (2002)

PAETEC/PAETEC, Inc. (2001) and AECOM/PAETEC, Inc. (2002)

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PAETEC/PAETEC, Inc. (2001) and AECOM/PAETEC, Inc. (2002)

Prepared by  
**DynCorp**

Prepared by  
**KAISER HILL**

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD83

Scale: 1" = 6250 feet  
not representative of actual distances



Figure 2  
Potential Remediation Area  
IHSS Group 800-2 (UBC 881,  
PAC 800-1206) and  
800-5 (UBC 887 and IHSS 177)

KEY

FY 2002 IHSS locations

FY 2002 PAC locations

FY 2002 UBC locations

Buildings and other structures

Foundation Drain

Sewer Line

NPWL

OPWL

TANK

Streams ditches or other drainage features

Paved areas

Dirt roads

Potential Air Sampling Location

N

Scale 1 800

30

0

30

60

Feet

State Plane Coordinate Projection  
Colorado Central Zone  
Datum NAD 27

U S Department of Energy  
Rocky Flats Environmental Technology Site

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